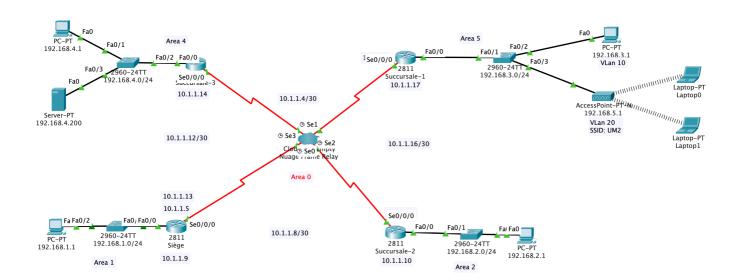# Wireless integration Network course

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The network diagram requested with DHCP server, Access Point and areas from 0 to 5

Introduction

In this homework we will add a DHCP server, a Wireless Access Point and OSPF Multi-Area Configuration to our previous network.

Cisco 8-port Switch Series   *Cisco 1811 Wireless Router*

We have 3 different sections:

Section one: Adding a DHCP Server

1-1 DHCP server

1-2 Routers

1-3 Switches

Section Two: Add a Wireless Access Point

2-1 Wireless Access Point

2-2 Switches

2-3 PC's

Section Three: Add OSPF Multi-Area Configuration

3-1 Routers

Section one: Adding a DHCP Server

The **D**ynamic **H**ost **C**onfiguration **P**rotocol (**DHCP**) is a network management protocol used on Internet Protocol networks whereby a **DHCP** server dynamically assigns an IP address and other network configuration parameters to each device on a network so they can communicate with other IP networks.

1-1 DHCP server:

We added a server and in the "Services Tab", we add 5 pools for 5 different sub-network s that we have in our network.

DHCP Pools				
	Start IP address	End IP address	Default Gateway	Subnet Mask
serverPool	192.168.1.1	192.168.1.100	192.168.1.254	255.255.255.0
serverPool-2	192.168.2.1	192.168.2.100	192.168.2.254	255.255.255.0
serverPool-3	192.168.3.1	192.168.3.100	192.168.3.254	255.255.255.0
serverPool-4	192.168.4.1	192.168.4.100	192.168.4.254	255.255.255.0
serverPool-5	192.168.5.1	192.168.5.100	192.168.5.254	255.255.255.0

Also, we need to set IP address of DHCP server manually, because this IP address will never change.

DHCP Static Configurations			
IP address	Subnet Mask	Default Gateway	DNS Server
192.168.4.200	255.255.255.0	192.168.4.254	It's not needed for instance

1-2 Routers:

To add DHCP Configuration to our network, we need to do the below configurations to our routers:

Siège Router:
We just need add ip of DHCP server to the F0/0 hand of router. To do that we need to add "ip helper-address 192.168.4.200" to the interface FastEthernet0/0.

Succursale-1 Router:
In the previous homework we had just one sub-network in this part. So we set the IP address of network 3 gateway that is "192.168.3.254", directly for the interface FastEthernet0/0. But now we added a new access point that takes the ip address of sub-network 5. So we need to remove previous ip address in the interface FastEthernet0/0 and add two sub-interfaces with relative VLans as below.

Sub-interface FastEthernet0/0.3	Sub-interface FastEthernet0/0.5
encapsulation dot1Q 10	encapsulation dot1Q 20
ip address 192.168.3.254 255.255.255.0	ip address 192.168.5.254 255.255.255.0
ip helper-address 192.168.4.200	ip helper-address 192.168.4.200

Succursale-2 Router:
As in the Siège Router we just need add ip of DHCP server to the F0/0 hand of router. To do that we need to add "ip helper-address 192.168.4.200" to the interface FastEthernet0/0.

Succursale-3 Router:
Because our DHCP server is in this sub-network and it's known for all sub-network 4, we don't need to add anything in this router.

1-3 Switches:

There is no needed to configure switches in 1,2 and 4 sub-networks.
Just because we added a new AP in the in interface FastEthernet0/3 and we also added two VLans in our switch, we need to add Trunk mode in the interface FastEthernet0/1 that is connected to the Router Succursale-1 and also we need to add VLans in the interface 2 and 3.

FastEthernet0/1	FastEthernet0/2	FastEthernet0/3
switchport mode trunk	switchport mode access	switchport mode access
	switchport access vlan 10	switchport access vlan 20

Section Two: Add a Wireless Access Point

In computer networking, a **W**ireless **A**ccess **P**oint (**WAP**), or more generally just access point (**AP**), is a networking hardware device that allows other Wi-Fi devices to connect to a wired network. The AP usually connects to a router (via a wired network) as a standalone device, but it can also be an integral component of the router itself. An AP is differentiated from a **hotspot**, which is the physical location where Wi-Fi access to a WLAN is available.

2-1 Wireless Access Point:

In this homework we add a WAP from Network Devices > Wireless Devices > AP-PT-N. We will set these information in the AP:

Wireless Access Point	
Bandwidth	100 Mbps
Duplex	Full
SSID	UM2
Authentication	Web
WEP Key	123456789A

2-2 Switches:

Just in the switch that in directly connected to the AP, we need to specified "Speed" and "Duplex" in the interface FastEthernet0/3 that is connected to AP.

Switch configuration			
FastEthernet0/3 switchport mode access	switchport access vlan 20	duplex full	speed 100

2-3 PC's:

For the both new laptops in the 192.168.5.0/24 network, we need to add a Linksys-WPC300N module provides one 2.4GHz wireless interface and also we will set "SSID", "Authentication", and "WEP Key". Also we will put IP Configuration on the DHCP mode.

Section Three: Add OSPF Multi-Area Configuration

An **OSPF** network can be divided into sub-domains called **areas**. An **area** is a logical collection of **OSPF** networks, routers, and links that have the same **area** identification. A router within an **area** must maintain a topological database for the **area** to which it belongs. When **Multi-Area** Adjacency is configured on an interface, the **OSPF** speakers form more than one Adjacency (ADJ) over that link.

3-1 Routers:

In our new WAP branch we added a new sub-network "192.168.5.0/24". In the previous homework we used Single-area OSPF in our network architecture (area 1). Now for use the Multi-area concept, we need to categorise our sub-networks. For this matter, we add 5 different areas in our OSPF configuration.

Area 0 is the middle part of our network that is consist of the Cloud and all it's related sub-networks.

Area 0 and it's sub-networks	
Network	**Placement**
10.1.1.4/30	Between "Succursale-1" and "Siège"
10.1.1.8/30	Between "Succursale-2" and "Siège"
10.1.1.12/30	Between "Succursale-3" and "Siège"
10.1.1.16/30	Between "Succursale-1" and "Succursale-2"

Other Areas		
Network	**Placement**	**Area**
192.168.1.0/24	In the sub-network 1	1
192.168.2.0/24	In the sub-network 2	2
192.168.3.0/24	In the sub-network 3	5
192.168.4.0/24	In the sub-network 4	4
192.168.5.0/24	In the sub-network 5	5